kind is indicated by any observations last night, though a few of the meteor tracks (perhaps five or six in all) would not pass strictly through the radiant if traced back. C. A. YOUNG.

Princeton, N.J., Nov. 28.

A bright meteor.

On Friday, Nov. 13, about 10.30 A.M., the attention of a number of our students was attracted by a brilliant meteor.

The appearance as described by Mr. H. Toulmin, of the senior class, is as follows: The path of the meteor began 15° or 20° west and north of the zenith, following a north-westerly direction, and ending some 20° from the horizon.

The brightness he compares to that of Venus when seen at night. The sun was shining brightly, and no clouds were noticed. No explosion was heard, nor did any fragments seem to reach the ground.

C. L. DOOLITTLE.

Lehigh university.

Absorption of mercurial vapor by soils.

Last year considerable attention was excited by the proposition to utilize the insecticide properties of mercurial vapor against the phylloxera or vine-louse. This suggestion originated with Mr. J. A. Bauer, a druggist of San Francisco, and himself the owner of a vineyard in the infested region of the Napa valley, where he had for some years experimented on the efficacy of mercury, and satisfied himself of its usefulness as a preventive of infection, when, in planting, each cutting was surrounded by a few inches of earth mixed with 'deadened' mercury. Upon publication of the fact, a considerable demand for the mercurial mixture (consisting of equal parts of finely divided mercury and clay or chalk) was made by persons interested, and many thousand vines were treated in different localities in the manner prescribed by Mr. Bauer. This was to mix thoroughly about a peck of earth with an ounce of the above mixture, and fill in with it the hole in which the cutting has been placed, to the depth of at least six inches from the surface. Many experiments were also made on vines already infested, to see if the mercury would gradually spread so as to disinfect the whole of the root system.

Contrary to expectation, most of these experiments proved a failure, inasmuch as the phylloxera seemed to continue, unchecked, on the roots already infested, and in some cases clean cuttings had become infested, despite the surrounding mercurialized soil.

Having witnessed a number of the successful experiments upon which Mr. Bauer's recommendations were based, I undertook an investigation of the circumstances of the reported failures, and soon discovered two that were essential. One was that the mercury used was considerably contaminated with lead, which is known to diminish exceedingly the evaporation of mercury; another, that oil had been used in order to facilitate the 'deadening' process, and thus each globule was covered with a film that additionally impeded volatilization. In fact, the iodine test for mercurial vapor showed that a mere trace of the latter existed around the mixture furnished by Mr. Bauer, while a similar one prepared with pure mercury showed abundant volatilization at the ordinary temperature, and acted very promptly upon insects.

Yet, upon using the latter mixture in the manner prescribed by Mr. Bauer, in a very clayey soil, neither the insects nor the iodine test manifested the presence of mercurial vapor. It was now remembered that Mr. Bauer's successful experiments had been made in a very sandy soil of the city of San Francisco; and the inference was plain, that, just as aqueous vapor would be absorbed to a much greater extent by a clay soil than by sand, so the mercurial vapor was at first absorbed by the former until saturation was reached, which might not be for many weeks or even months; the soil acting as an effectual disinfectant until supersaturated.

Experiments proved this surmise to be correct; and the investigation, still in progress, seems to show that the capacity of soils for the absorption of aqueous vapor may serve as an approximate measure of their relative capacity for the absorption of mercurial vapor also. Thus in pure sand, which in a saturated atmosphere at 15° C. absorbed only .5 per cent of aqueous vapor, the amount of mercurial vapor absorbed was too small for analytical determination; while in a clay soil, absorbing, under the same conditions, 6 per cent of watery vapor, the mercurial vapor retained at 49° C. amounted to .012 per cent, equivalent to about 130 grains per cubic foot of soil. Now, since from one-fourth to one-half cubic foot was used in the treatment of vines, it follows that from 33 to 65 grains of metal out of the 240 used in each case, would have to evaporate and impregnate the soil, before any free vapor would be available for action on the insects. At the low temperature of the soil this would naturally take a considerable length of time: hence the failures.

It is of course perfectly feasible to insure this impregnation beforehand by exposing the mercurialized soil to a higher temperature (e.g., to that of 49° C., easily attained in California by exposure to the sun) for ten or twelve hours, or for a much shorter time to steam-heat. A clay soil so prepared will act on the phylloxera as promptly as when sand is used; all being dead, or incurably poisoned, within from 20 to 30 hours.

The method is therefore far from being a failure, as has been industriously represented by interested parties. It will accomplish all that has ever been claimed for it; to wit, the preservation of young vineyards from infection through the ingress of the phylloxera from above; and, as there is no occasion for disturbing the earth immediately surrounding the stock of a vine, there is no reason why this protection should not continue for all the time the vine is likely to live. With proper precautions, it will also, no doubt, be available against other insect pests of similar habits; e.g., the 'woolly aphis' (Schizoneura lanicera Hausm.). The conditions for successful application in practice in various cases are still under investigation. E. W. HILGARD.

Agric. exper. station, Berkeley, Cal., Nov. 23.

The English sparrow.

Your correspondent in *Science*, No. 147, asks for information in regard to the English sparrows. In this city (Cincinnati) and vicinity there are large numbers of these birds, and local ornithologists have no hesitation in saying they drive away the native songsters.

At my house, in one of the thinly populated suburbs,

they were abundant during the summer. A patch of woods close by harbored many native birds which occasionally strayed into trees near the house. As soon as one of these ventured to alight on a branch, the sparrows would desert the eaves of the house and settle on the tree, and there they would chirp and chatter till the other bird was literally driven away. Robins and flickers were greatly annoyed, but the cat-bird flirted his tail in disdain, and seemed to be the only one which could not be driven away.

As for their insectivorous habits, I have been informed by Mr. Charles Dury that he has dissected forty or fifty of the birds which were shot at different times and places during two years. In none of these, with but a solitary exception, did he find a trace of the remains of an insect. Every one was filled with seeds of one sort or another; and he concluded the insect had been picked up and swallowed by mistake. Still, it would appear that numbers of cicadas were killed, though not eaten by the birds, here as well as in Washington.

As far as the extermination of the sparrow goes, it does not seem a difficult task. Let the laws protecting it be repealed. Let a bounty be offered for every scalp, and free permission to kill whenever and wherever found would tend to rapidly diminish the number of the pests. The increase in number is largely due to the protection afforded by law, and by the sentiment of people. If wolves, bears, and panthers can be exterminated by the means above spoken of, there seems little reason to say that the same result would not follow with the sparrow.

JOS. F. JAMES.

Cincinnati, Nov. 27.

I would like to give some information in regard to the habits of the English sparrows, which I hope will soon be stamped as outlaws, and a price put on their heads, like unto those of all marauders.

They not only drive away our native birds, but are the worst enemies of the fruit-grower and gardener. They are not scavengers, but, on the contrary, by their habits become defilers of human dwellings and water. I will give such facts as came to my notice during many years of observation at my home in Hudson county, N.J., which will substantiate the above assertions.

We had provided numerous boxes for nests for bluebirds and wrens in the trees, and before the introduction of the English sparrows in New York, in 1864, these were invariably occupied by the same family each spring: additional nests were always soon occupied. Any one acquainted with these pretty little singers will understand the peculiar charm they lend to a country home. During the summer-time the grove would be full of thrushes, who would build their nests in the underbrush, and fill the morning and evening air with their melodious song.

Within four years after the introduction of English sparrows, they had found their way to our home, and immediately began harassing the bluebirds, sometimes destroying their nests. As soon as we noticed this, we took the part of our pets the bluebirds, and would fight the sparrows at every point. This was soon noticed by the bluebirds; and it actually happened, that, when hard pressed by the sparrows, they would fly close to the house, to attract our attention to their trouble by plaintive cries. We succeeded in protecting them for a few years; but, with the rapid increase of the sparrows, the bluebirds have left their former abodes, never to return to them except as travellers.

When we noticed that the wrens were harassed in a similar manner, we made the entrance holes to the boxes so small that sparrows could no longer enter. We then found that the sparrows would take turns about sitting on the perch in front of the opening until the old wrens had left, or until the young ones were starved. In two cases we found that old wrens had been kept imprisoned until starved to death by the sparrows preventing their exit. We did all we could to drive them off, — shot them with guns, caught them in traps, destroyed their nests, etc.; but all in vain. They learned to recognize a gun, and, as they always have guards in a flock, a signal from a guard would scatter them to the winds instantly. They could only be caught in traps for but a short time, when again they would become acquainted with them, and avoid them. The best way to drive them away seems to be to destroy their nests without tiring; then they will partly leave. They would fight the brown thrush, and scatter its eggs, whenever opportunity presented itself, and seemed to take particular delight in pulling the nests to pieces to build their own with the *debris*.

In spring they destroy the strawberries, to begin with, and attack every variety of fruit, except currants, gooseberries, and apples. They do not feed on cherries to make their living, like native birds, but merely take a bite of each berry, and destroy it wantonly. When pears are ripe, they will peck large holes in them to drink the juice. They generally appropriate half our vineyard, and cannot be frightened by scarecrows. They invariably keep themselves busy, when not hungry, by picking off young sprouts, especially of fine plants and rose-bushes, but do not spare trees. It seems that they do this merely to keep themselves busy. In addition to the above, they do not destroy worms which build a web, although they probably destroy chrysalides or open cocoons in winter-time, when they can find no other food. We have never seen them destroy worms in summer-time, when other food is abundant.

G. C. HENNING.

Louisville, Ky., Nov. 27.

A new variable.

As an item of interest for your astronomical notes, I send the following: —

I have discovered the star D.M. +27,3890, to be a variable of the η Aquilae type.

A preliminary reduction of the observations so far obtained, from which a light curve has been formed, indicates strongly that the period will not vary much from four and a half days. The approximate limits of fluctuation I find to be from 5.6 to 6.7 mag. The position of the star for 1855.0 is R.A. $20^h\ 45^m\ 19^s.4$; decl. $+27°\ 42'.3$.

The star is likely to prove an interesting one, owing to its short period, there being only three known variables of this type with shorter periods.

The variability and character of the light changes have been confirmed by Mr. S. C. Chandler, jun., of the Harvard college observatory.

EDWIN F. SAWYER.

Cambridgeport, Mass., Nov. 30.